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PROVISIONAL SPECIFICATION.

Improvements in Sterilising Apparatus and Containers, particularly adapted for Treating and Containing Dressings, Instruments and the like, Employed for Surgical and Medical Purposes.

We, JAMES ERNEST ARNOLD, of the Firm of Arnold & Sons, of 31, West Smithfield, in the City and County of London, Instrument Makers, and WILLIAM BRUCE CLARKE M.A. M B Oxon: F.R.C.S of 51 Harley Street in the County of London do hereby declare the nature of this invention to be as follows:—

In sterilising dressings, instruments, and the like employed for surgical and medical purposes, it is usual to place the dressings or other articles (hereafter termed dressings) in a container or kettle, which is provided with a lid and which container is formed with apertures, so that upon being placed in a steriliser or closed chamber, the dressing contained in the kettle is subjected to the action of steam. The steriliser is then opened and the apertures in the kettle are immediately closed by suitable devices provided for the purpose, and when removed the contents of the kettles are ready for use.

Such devices, however, present some disadvantages in practice, as for instance, the kettles so constructed are practically open to the air the moment the steaming chamber of the steriliser is opened, and even supposing that the apertures in the kettle can be perfectly closed as soon as possible (which closure is not in fact by any means perfect) then there is a space of time between the opening of the sterilising chamber and the closure of the kettle apertures in which a certain amount of air, which may carry germs, has access to the interior of the kettle.

Similarly in regard to the steriliser, faults also exist as they are usually constructed, particularly in that they cannot be taken to pieces with reasonable ease, and in fact the taking-to pieces of sterilisers as ordinarily constructed for such purposes, is impracticable. The object therefore of this invention, is to so construct the kettles that they do not require closing and in fact are already closed at the time the sterilising chamber is opened, and to so construct the steriliser that it can be readily taken to pieces for cleaning or repairs without entailing a considerable amount of work and consequent expense.

According to this invention therefore we construct the kettles of a body casing in the form of a right prism, which may be square or circular in cross section, and near one end of such casing we fix a perforated diaphragm, providing near the other end an internal annular flange or beading to support another removable perforated diaphragm. There is further provided two removable covers, which fit into or onto the ends of the casing, and these covers are also perforated and provided with devices of any preferred construction, such as bayonet slots and pins by which they may be secured in position when applied to the said ends of the casing.

By these means each end of such a casing has as it were a double perforated cover, and the inter-spaces between the outer covers and the diaphragms are filled with cotton wool or other suitable material, while the interior of the casing between the diaphragms serves as the space in which the dressings or other materials or articles are placed which are to be sterilised.

[*Price 8d.*]

Arnold and Clarke's Improvements in Sterilising Apparatus and Containers.

No perforations are formed in the outer casing, and the action of the steam or other sterilising gas or vapour takes place by passing through the perforated ends of the casing and through the cotton wool or equivalent which forms the closure of the ends, and which is located, as aforesaid, between the covers and the perforated diaphragms.

It will be seen that a kettle so constructed when charged and closed, can, after having been subjected to the action of the steam in the sterilising chamber, be removed therefrom without the possibility of germs being carried to the sterilised dressing, and when such a kettle is opened by the removal of that cover above the removable perforated diaphragm, the packing in between the said cover and the said diaphragm is taken away and the dressing perfectly sterilised can be conveniently removed for use.

The sterilising apparatus consists of an open topped casing of metal, having a water jacket entirely around its sides and base, the said base being inclined downwards to the centre, in fact forming an inverted cone, the base exterior of its water jacketted casing, being fitted with wings or blades upon which it can be stood when removed from the supporting frame hereafter mentioned.

The upper edge of the water jacketted casing is fitted or formed with a flange, and the supporting frame preferably consists of a cylindrical or other shaped metal sleeve within which the water jacketted casing is placed, so that its flange rests upon the top of the said sleeve, and this sleeve at its base is provided with legs upon which it can conveniently stand.

From the lowest point of the base of the water jacketted casing there extends a steam exhaust pipe, which communicates with the interior of the casing, and this exhaust pipe is fitted with a union or other convenient connection within the sleeve, and to that union connection is detachably fixed a short flexible tube extending through the wall of the sleeve and itself being connected, exterior of the sleeve, to some suitable pipe or the like by which the exhaust steam is carried away.

At or about the base of the water jacket, there is another pipe connection which serves as the supply pipe for the water which is to be contained within the water jacket, and this water supply pipe is likewise fitted with a union device within the sleeve, which is also connected to a flexible tube, connected, exterior of the sleeve, with an upstanding tube and the top of which has a funnel or equivalent device by which the water or other liquid can be conveniently supplied to the water jacket. This upstanding tube of the supply pipe may be of transparent material and serve as a water gauge.

Suitable heating devices such as a series of gas jets are fitted below the base of the casing, and such jets may be supported from the sleeve or its supporting legs, and upon the water in the said jacket being heated, the steam therefrom escapes by a series of apertures formed near the top and in the interior of the water jacketted casing.

Both the exhaust pipe and the supply pipe are very readily disconnected from the casing within the sleeve, and thereby the said casing can be easily removed from the sleeve when desired and replaced with equal facility, it being then only necessary to remake the connections.

A removable cover is provided for the top of the casing, which cover may be secured to the flange of the casing by any suitable devices which are capable of ready connection and disconnection, and the said cover is fitted generally with a safety valve, a thermometer, and a pressure gauge. In the interior the water jacketted casing is provided with a grid flooring, above the coned base, for supporting the kettles which are placed therein.

Dated this 2nd day of June 1904.

BREWER & SON,
London and Leeds,
Agents for the Applicant.

COMPLETE SPECIFICATION.

Improvements in Sterilising Apparatus and Containers, particularly adapted for Treating and Containing Dressings, Instruments and the like, Employed for Surgical and Medical Purposes.

We, JAMES ERNEST ARNOLD, of the Firm of Arnold & Sons, of 31, West Smithfield, in the City and County of London, Instrument Makers, and WILLIAM BRUCE CLARKE, M.A. M.B. Oxon, F.R.C.S., of 51, Harley Street in the County of London, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

In sterilising dressings, instruments, and the like, employed for surgical and medical purposes, it is usual to place the dressings or other articles (hereinafter termed dressings) in a container or kettle, which is provided with a lid, and which container is formed with apertures, so that upon being placed in a steriliser or closed chamber, the dressing contained in the kettle is subjected to the action of steam. The steriliser is then opened and the apertures in the kettle are immediately closed by suitable devices provided for the purpose, and when removed the contents of the kettles are ready for use.

Such devices, however, present some disadvantages in practice, as for instance, the kettles so constructed are practically open to the air the moment the steaming chamber of the steriliser is opened, and even supposing that the apertures in the kettle can be perfectly closed as soon as possible (which closure is not in fact by any means perfect) then there is a space of time between the opening of the sterilising chamber and the closure of the kettle apertures in which a certain amount of air, which may carry germs, has access to the interior of the kettle.

Similarly in regard to the steriliser, faults also exist as they are usually constructed, particularly in that they cannot be taken to pieces with reasonable ease, and in fact the taking to pieces of sterilisers as ordinarily constructed for such purposes is impracticable.

The objects therefore of this invention are to so construct the kettles that after the sterilisation in the steaming chamber is completed, and the latter chamber is opened, the kettles are already perfectly closed by a layer of cotton wool, and further, to so construct the steriliser that it can be conveniently manipulated for use, and can be readily taken to pieces, for cleaning or repairs without entailing a considerable amount of work, and consequent expense.

In order that the invention may be readily understood the apparatus will be described with reference to the accompanying drawings, whereon:—

Fig: 1 is a vertical section of one of the improved kettles, and Fig: 2 an elevation of the upper end of same to shew an example of joint for connecting the cover to the body.

Fig: 3 shews in vertical section a modified construction of a similar kettle, the covers being illustrated in an open position. Fig: 4 is an elevation of one end to illustrate means for fastening the covers, and Fig: 5 is a plan view of the container with the cover closed.

Fig: 6 is a vertical section shewing the improved construction of sterilising apparatus.

According to this invention a kettle is mainly composed of a hollow body in the form of a right prism which may be square or circular in cross section, and such a body can be conveniently made of copper.

Referring to Fig. 1, 1 is the body of the kettle, in this case of cylindrical

formation, and at the base there is fixed a perforated diaphragm 2, while near the other end is formed an internal annular flange 3 or beading which serves to support another removable perforated diaphragm 4. Both of these diaphragms may be formed or provided on their outer surfaces with a ring 5 encircling the perforations, and such a ring serves to confine a layer of cotton wool (not shewn in the drawing) which is placed and packed-in on the outer sides of the diaphragms 2 and 4. If desired, the removable diaphragm 4 may be fitted with means by which it can be temporarily fixed upon its seatings upon the flange 3, but generally such a fixture is not necessary, and consequently is not shewn in the drawing.

To such a structure there is further provided two similar movable covers 6, which fit with flanges as shewn on to the ends of the body 1, and these covers 6 are also perforated as shewn, and provided with means such as the bayonet slots 7 and pins 8, by which they may be secured in position when applied to the ends of the casing 1, and there is an illustration shewing such a bayonet slot fixture at Fig: 2 of the drawings. 9 is a handle by which the kettle can be carried or lifted in and out of the sterilising chamber.

Instead of making the covers 6 and the perforated disc 4 entirely removable from the body 1, it is obvious that the said parts may be hinged to the body, and this in practice has been found to be a convenient and preferable arrangement as obviating the parts becoming mislaid or mis-placed. Such a construction is illustrated at Figs: 3 to 5, where the movable perforated covers 6 are hinged at 10 to a portion fixed to the body 1, and similarly the movable perforated diaphragm 4 is likewise hinged at 11 to an extension 12 from the body, and if desired that portion of the extension marked 12 may itself be perforated.

With such a device it will be understood that the materials to be sterilised such as dressings, instruments, and the like, are placed within the body 1 of the kettle, the perforated diaphragm 4 is closed down and a layer of cotton wool is placed on the exterior surface of the diaphragm 4 (and the part 12 where such is perforated), and on the exterior surface of the fixed diaphragm 2, and then the movable covers 6 are closed down, and in the construction now described are fastened by means for instance of a sliding bolt 13. (Figs: 4 and 5).

No perforations are, as will be observed, formed in the body 1 of the kettle, and therefore the action of the steam or other sterilising gas or vapour takes place by passing through the perforated ends, and through the cotton wool or equivalent, which forms the closure of those ends, which cotton wool or equivalent is located as aforesaid between the movable covers and the perforated diaphragms.

It will be seen that a kettle so constructed when charged and closed, can, after having been subjected to the action of the steam in the sterilising chamber, be removed therefrom without the possibility of germs being carried to the sterilised dressing, and when such a kettle is opened the cotton wool packing in between the said cover and the said diaphragm is taken away and the dressing, perfectly sterilised, can be conveniently removed for use.

The improved sterilising apparatus is shewn as aforesaid at Fig: 6 and consists of an open-topped casing of metal 14, another similar casing of larger size being arranged exterior of the casing 14 so as to form a water space 16 between the two, and both these cases are fixed to a metal ring 17 which forms a flange.

The bases of the cases 14 and 15 are inclined downwards to the centre, in fact forming an inverted cone, and the casing 15 may be fitted with wings or blades 18 upon which it can be stood when removed from the outer case hereinafter mentioned.

From the lowest point of the base of the casing 14 which forms the container for receiving the kettles or other articles to be sterilised, there extends a steam

exhaust pipe 19, which communicates with the interior of the casing, and extends through the outer case 20 where it is fitted with a screwed down valve 21, and there is a flexible tube 22 for drawing-off and conveying away the water of condensation or exhaust steam. This exhaust steam pipe 19 is composed of two parts, one of which extends to the interior surface of the outer case 20, and is there formed with a screwed nozzle 23 so that the other portion of the pipe 19 exterior of the case 20 can be passed through an aperture in the case and screwed into the said nozzle 23; therefore, when it is necessary to remove the combined casings 14 and 15 by means of their common ring-flange 17 from out of the outer case 20, the exterior portion of the pipe 19 is unscrewed from the nozzle 23 and the portion of the pipe 19 then interior of the case 20 being so disconnected will not prevent such removal of the water-jacketted container comprised by the said casings 14 and 15.

At 24 is fitted a funnel by which the space between the double-walls 14 and 15 of the container can be supplied with water, the water passing in by the pipe 25. This filling tube is combined with a water level gauge 26 of ordinary construction, the lower communication of the said gauge with the water space 16 being by the pipe 27.

The pipe 27 is of such a length that it does not extend beyond the interior surface of the outer case 20, and is then connected by any well-known joint to the lower connection of the water gauge, but this joint although of any well-known construction should be such that it can be disconnected, and again connected from the outside of the case 20 in order to allow of the extraction of the water jacketted container from the said case. Similarly, the connection of the pipe 25 to the upper tubular connections of the water gauge and funnel should be of a like character.

28 is an ordinary atmospheric gas burner in the form of a ring below the water-jacketted container, and is supplied with gas and air by a pipe 29 similarly connected to an exterior supply pipe 30, so that disconnection can be effected in the manner previously described.

Around the upper part of the inner casing 14 of the container are a number of perforations 31 by which steam from the water-space 16 may pass to the interior of the container.

A removable cover 32 is provided for the top of the water-jacketted container, which cover is fitted with a metal flange 33 which fits upon the flange 17, and between the two flanges there may be any suitable steam packing if required, and screw studs 34 project from the flange 17, pass through holes in the flange 33, and are fitted with wing nuts 45, by which the two rings 33 and 17 are clamped together, and a steam-tight joint secured with ease and certainty. 36 is a steam pressure gauge, 37 a thermometer, and 38 a safety valve, all provided on the cover 32.

In the interior of the container there is fitted a grid or perforated flooring 39 upon which the kettles or other apparatus or materials may rest, and be held away from the water of condensation, and subjected to the action of the dry steam.

To bring the apparatus into use, the space 16 is filled with water up to a suitable level by means of the funnel 24, the water passing by the funnel cock 40 through the gauge cock 41 and the pipe 25, and then the funnel cock 40 is closed and the guage cocks 41 and 42 opened; the kettles such as previously described are then placed upon the grid 39 within the container, and the top 32 closed steam-tight by means of the wing nuts 35, and the gas jets of the ring 28 lit.

The gas being lighted, the water very soon reaches the boiling heat of 212 F. and in a few minutes more the temperature will have reached 220 F. and the pressure gauge will indicate a pressure of about 5 lbs. By slightly diminishing the supply of gas it is quite easy to keep the temperature and pressure constant

for an hour or so; a quarter of an hour is however sufficient for sterilising purposes.

The construction of sterilising apparatus described presents advantages in practice, in that the top 32 can be easily placed in position, and a steam-tight joint ensured, while the fittings shewn are conveniently placed and are of good practical construction, and all the joints and unions of the pipes are so arranged that any person without the employment of specially skilled assistance can take the whole steriliser to pieces, clean it, and if necessary get a leak repaired by any local tin or copper smith, and refit the apparatus so that it is as efficient as ever.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In sterilising apparatus for treating dressings, instruments, and the like employed for surgical and medical purposes; a kettle constructed with double perforated covers adapted to receive between them a layer of cotton wool or other suitable material to form a closure, and at the same time to admit steam for sterilising purposes, substantially as set forth.

2. In sterilising apparatus for treating dressings, instruments and the like employed for surgical and medical purposes; a kettle constructed with a perforated diaphragm fixed near one end and a movable or detachable perforated lid at that end, adapted to receive a layer of cotton wool or other suitable material between the said lid and the said diaphragm to form a closure, and a movable perforated diaphragm near the other end of the kettle, and a movable or detachable perforated lid at that end to receive a layer of cotton wool or the like between the said lid and the said diaphragm, substantially as set forth.

3. In sterilising dressings, instruments and the like employed for surgical and medical purposes; a steriliser consisting of an outer stationary case containing a removable container having double walls forming a water space, perforations through the upper part of the inner wall of the container through which steam enters the interior thereof, a steam-tight removable cover for the container, a perforated grid in the container to support the kettles and articles to be sterilised, and pipes from the container to the water space and the like, such pipes being connected to the pipes exterior of the stationary case by joints detachable from the exterior of the said stationary case to permit of the container being removed and replaced for repair or examination, substantially as set forth.

4. In sterilising dressings, instruments and the like, employed for surgical and medical purposes; a steriliser with its stationary outer case, its double-walled removable container supported by a flange 17 on the outer stationary case, a removable cover with its flange 33 constructed to form a steam-tight joint with the flange 17, the steam gauge 36, the safety valve 38, the water guage 26, the heating apparatus, and the several pipes and connections constructed as and for the purposes described with reference to Fig: 6 of the accompanying drawings.

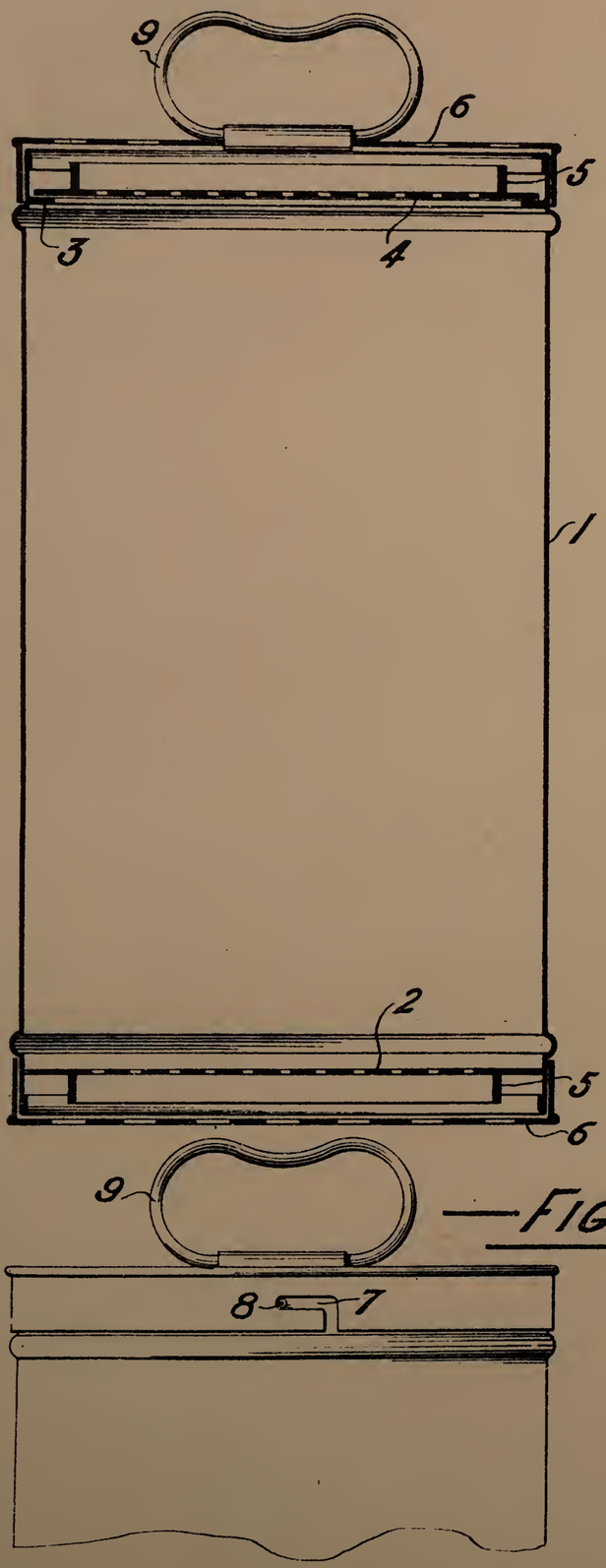
Dated this 27th day of February 1905.

BREWER & SON,
London & Leeds,
Agents for the Applicant.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1905

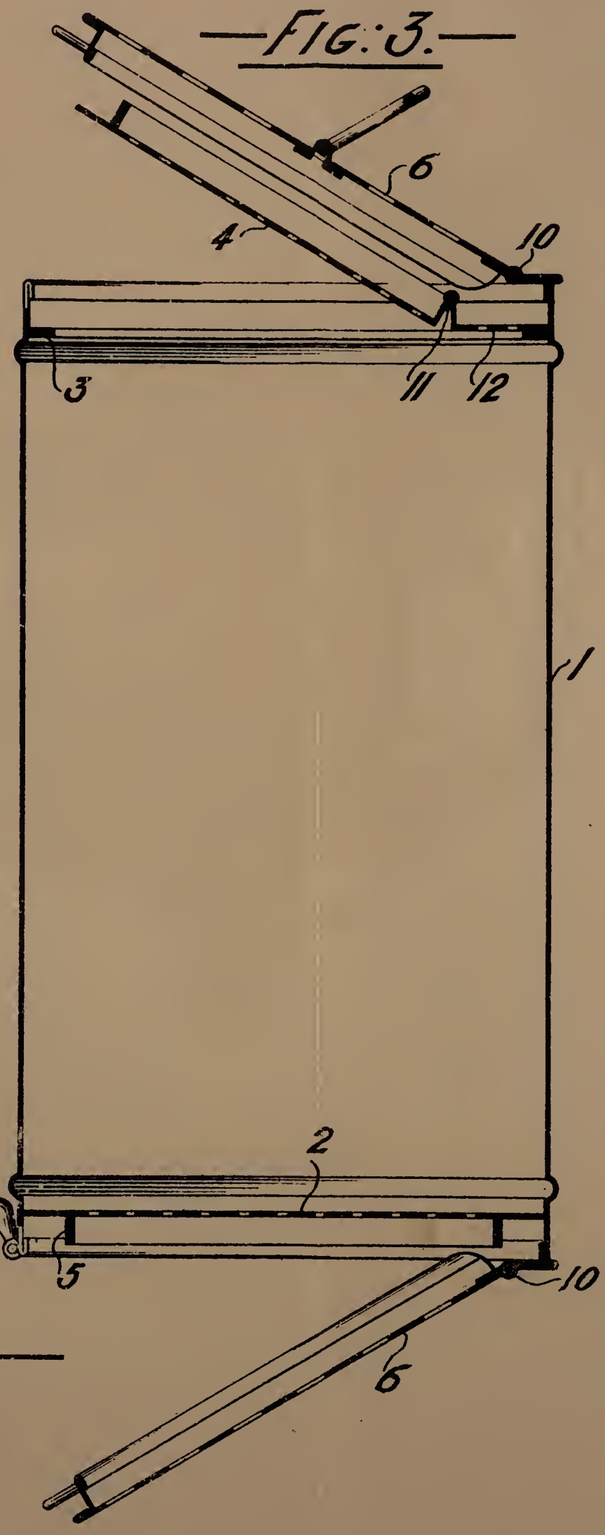
[This Drawing is a reproduction of the Original on a reduced scale.]

—FIG: 1.—

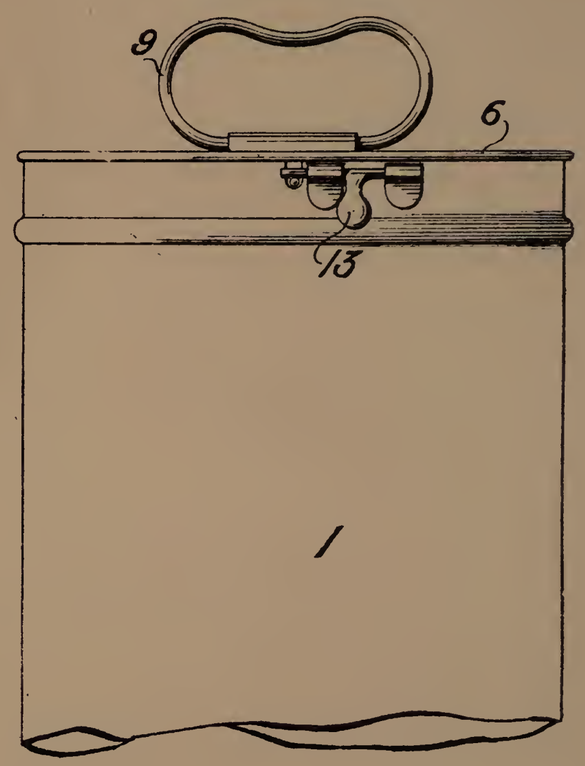


—FIG: 2.—

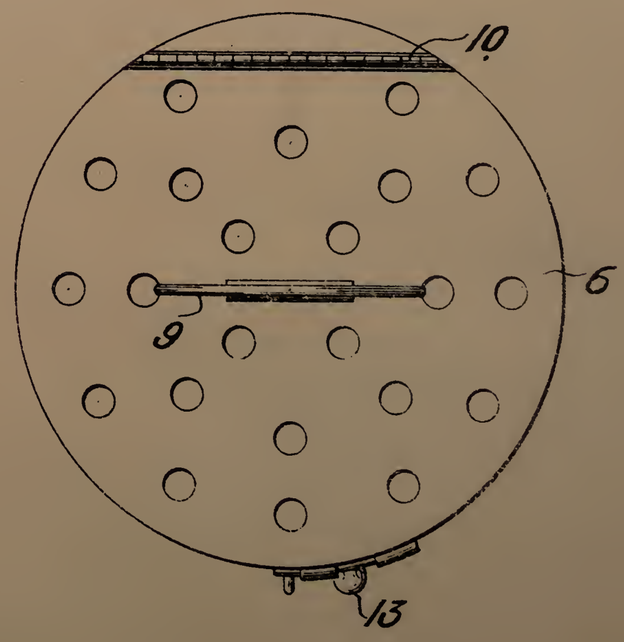
—FIG: 3.—



—FIG: 4.—



—FIG: 5.—



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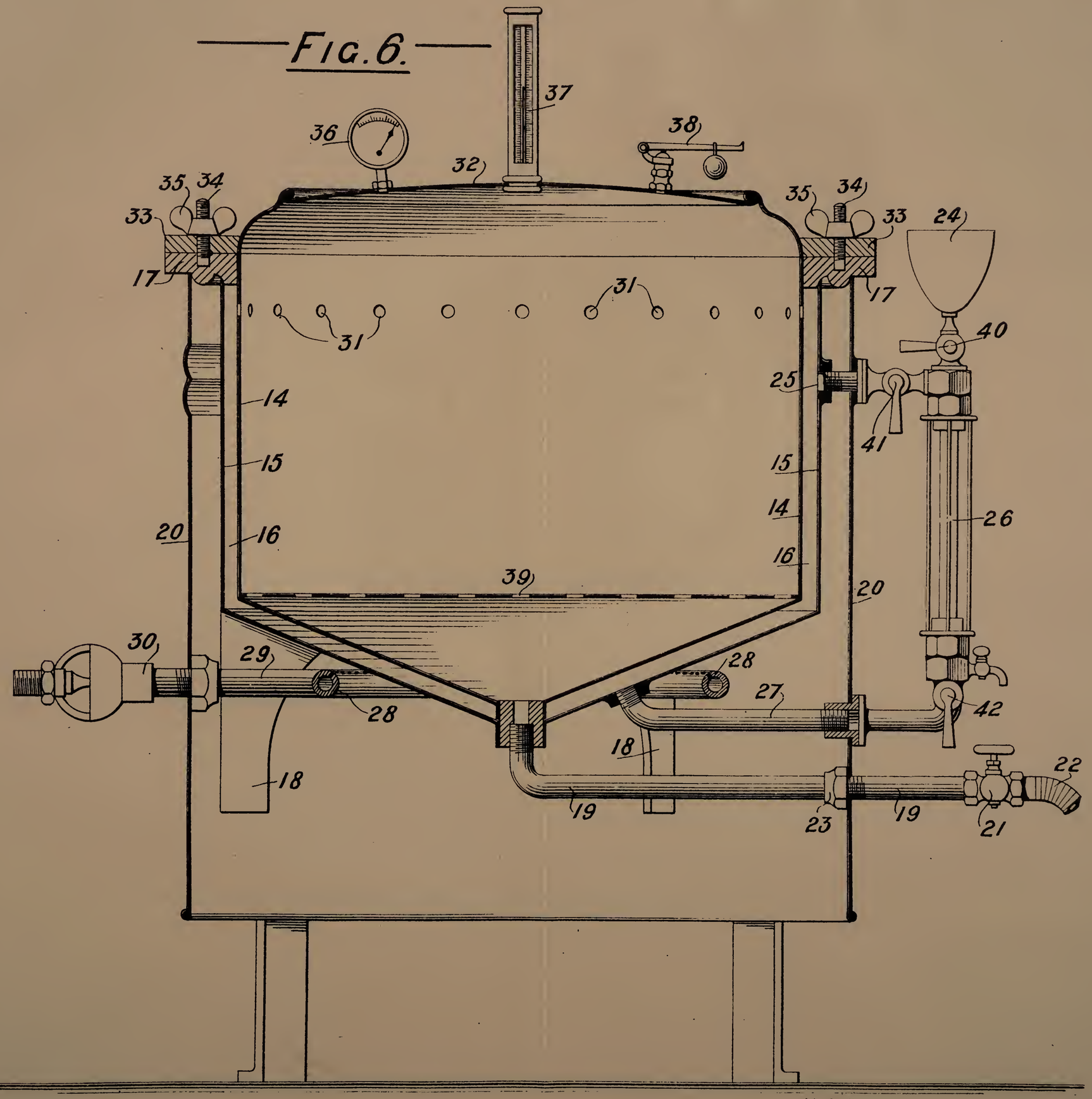
[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 6.



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